THE DUBLIN

QUARTERLY JOURNAL

OF

MEDICAL SCIENCE.

FEBRUARY 1, 1860.

PART I.

ORIGINAL COMMUNICATIONS.

ART. I.—*On Scalds of the Larynx.* By PHILIP BEVAN, M.D., Fellow and Professor of the Royal College of Surgeons, Ireland; Surgeon to Mercer's Hospital, &c.

WILLIAM CARROLL, aged two and a half years, a healthy child, from Adam-court, was brought to Mercer's Hospital, at 7 o'clock, P. M., on the 25th of September, 1852, ten minutes after having drank boiled flax-seed tea from the spout of a kettle. He screamed violently after the accident, but did not suffer from difficulty of breathing, and, therefore, the parents would not leave him in hospital.

On the following morning, Sunday, he was again brought to hospital: his parents stated that he suffered very little till 10 o'clock last night, when his breathing became difficult. At 10 A. M., i. e. fifteen hours after the accident, his respiration was most difficult, hurried, and stridulous; pulse rapid and small; no mucous rhonchus; no crepitus; face very slightly congested; not comatose. With great difficulty we made him swallow medicine, as his mouth and fauces were sore; the epiglottis is swollen and hard, the size of a nut. He was ordered a mixture of two grains of tartar emetic in an ounce each of water and syrup, a teaspoonful to be taken every ten mi-

nutes till vomiting supervened; after a few doses he vomited freely; he was ordered a grain of calomel every hour, and three leeches to be applied over the sternum. At 2 o'clock P. M., symptoms much worse, his breathing difficult and croupy; he falls into a slumber every minute; his eyes remain half closed; no other change; ordered three leeches to the sternum; continue the calomel.

4 o'clock P. M. A consultation was held, to decide as to the immediate performance of tracheotomy. The leeches had decidedly relieved the respiration; when we entered the ward he was dozing, but easily awakened; there was not so much croupy respiration, although there was a considerable amount of mucous rhonchus over a great part of the chest. Pulse about 150, not weaker than before the last leeching; the bowels had been purged once. After careful consideration, my colleagues and I agreed to delay the operation, as the child had been so much relieved by the leeching, and the pulse remained sufficiently strong to bear a repetition of the same treatment. He was ordered two grains of calomel, and three of compound chalk powder every hour, and to have three leeches again applied over the sternum; also, mercurial ointment over the axilla and abdomen. 7 o'clock P. M. Child lies half comatose, but can be roused; pulse about 120; respiration 30 in the minute; when roused, he sits up, takes his powder, and falls asleep again; skin warm; respiration less croupy.

27th. To my surprise, I found him sitting up in bed; the croupy respiration greatly relieved; lungs much improved; no pneumonic crepitus; bronchitic rales less distinct, but a good deal of mucus still rattling in the large bronchial tubes; he coughs freely and expectorates the mucus easily; pulse 120; he has had three large green stools during the night; skin cool. Continue the calomel every third hour; milk diet.

28th. Calomel stopped, as the bowels were several times purged.

He left the hospital on the 30th, quite well, except slight cough. The epiglottis, although reduced in size, still feels thicker and fuller than natural.

Patrick Byrne, aged three years, was admitted into hospital on the 7th September, 1858, having swallowed boiling water from the spout of a kettle at 6 o'clock, P. M., on the evening of the 6th, i. e. fifteen hours previously. He lies dozing in his mother's arms; respiration difficult and croupy; face congested; his mouth, as far as I can see, is white; and the epiglottis is hard, round, and like a large cherry: this proves that

either the vapour or the water had come in contact with the epiglottis. The mother stated that he spat out the water as soon as he took it into his mouth. Ordered: three leeches to the sternal region; solution of tartrate of antimony and potash, one grain to the ounce of water, two teaspoonfuls every ten minutes till vomiting be produced. A cathartic turpentine enema, if bowels not acted on by the tartrate of antimony; one grain of calomel every hour, and mercurial ointment into each axilla. At 3 o'clock P. M., child still drowsy; face turgid; pupils contracted; inspiration very stridulous and difficult, mucous rattling in large bronchial tubes, and sonorous râles over base of both lungs; leeches bled freely; bowels not opened by enema; is very thirsty, constantly craving cold water; repeat enema immediately; three leeches to the top of the sternum, followed by stuping with hot water. 9 o'clock, P. M., saw him again: bowels opened freely by enema; leeches seemed to give him great relief; his breathing less sonorous; still very drowsy; lungs as before. Calomel to be continued, unless hypercatharsis is induced.

8th. In the morning I found him sitting up in bed, much relieved, but breathing is still sonorous, and less mucus in the bronchial tubes; he is reported to have been very drowsy, but purging commenced at 3 o'clock in the morning (my notes do not state if the stools were green). Repeat calomel every second hour; he continued to improve during the day.

9th. Still improves; slept well, but is so cross and unruly that I cannot satisfactorily examine his chest; however, there is less mucus rattling in his lungs, which he coughs up with tolerable ease; the epiglottis is still swollen, but probably smaller than at first; bowels twice moved; his mouth is very sore from the mercury, so that he can only eat the softest panada. He continued to improve, and left the hospital in a few days, perfectly well, except slight cough.

Bridget M'Bride, one year and ten months old, a delicate and feeble child, from 44, Cuffe-street, admitted on the 1st of October; had taken a draught of boiling coffee out of a kettle, at about 12 o'clock noon. She was brought to Mercer's Hospital at 2 o'clock P. M., but was immediately taken home; she was brought back again at 3 o'clock P. M., i. e. three hours after the accident. I was sent for, and saw her soon after; she was lying with her mouth open, half asleep; her breathing stridulous and croupy. My finger introduced into the mouth detected the epiglottis very hard and round, of the size of a gooseberry; mouth and lip scalded; feet cold; face and chest

bathed in cold sweat. I never saw a case so bad in so short a time after the accident. Ordered two leeches to the upper part of the sternum; an emetic of two grains of tartar emetic to an ounce of water, a teaspoonful every ten minutes till vomiting was produced; if bowels not purged, a simple enema; one drachm of mercurial ointment in each axilla, and one grain of calomel every hour. 7 o'clock P. M. Appears worse; more difficulty of respiration; pulse most rapid and weak; lies, as before, comatose; stridulous and sonorous râles over the back of the lungs, but no dulness on percussion; alæ nasi forcibly dilated; deep pits, during each inspiration, above the clavicle, from the violent efforts made to inflate the lungs; eyes suffused, and pupils dilated. The emetic vomited her well, but, as the bowels were not moved, the enema was administered, and produced a large evacuation; the leeches bled freely, and seemed for some time to give her relief. Although the pulse was weak, I ordered two leeches to the sternum, and stuping afterwards, and mercurial ointment over the back of the chest. I confess I did not expect to see her alive in the morning. If sufficiently strong, I directed the resident pupil, Mr. Cumming, to apply leeches again during the night, and to continue the calomel.

October 2nd, twenty-one hours after the accident. I was informed that she was better: I found her asleep; her breathing very croupy and difficult; the pits above the clavicles seemed as well marked as before, but, as soon as she roused up, all the symptoms seemed better, the breathing less noisy; still the improvement, although evident, was not considerable: sibilant and sonorous râles are heard over the most part of the chest, and a quantity of mucus is rattling in the bronchial tubes; pulse very rapid, not weaker than last night; she cried out lustily, and drank a little milk when awake. Two more leeches over the sternum, mercurial ointment over the chest; continue the calomel. 3 o'clock P. M. I thought her breathing more difficult; pupils dilated; very restless; two more leeches.

3rd. The child is much improved: breathing nearly natural and quiet, but extremely restless, and her mother says she is more sick than ever; however, her respiration and all other symptoms are decidedly improved; nurse reported that she had two green stools at 2 o'clock A. M, i. e., thirty-five hours after my first visit; during that time she had been constantly rubbed with mercurial ointment, and had taken thirty-six grains of calomel. I passed my finger over the epiglottis; it is still large and hard. 5 o'clock P. M. I found the child sleeping calmly, and respiring quite easily.

4th. Child breathes naturally, no croupy sound; mouth nearly well; green stools; coughs up mucus freely.

5th. Patient is gradually improving. Respiration natural, except slight bronchitis; no croupy inspiration; unless that she is cross, she seems well, but is very weak; epiglottis is still large, but certainly reduced in size. No treatment.

6th. Left the hospital quite well, except a scald of the lip and mouth.

Ann Jane Fitzgerald, aged two and a half years, a delicate but healthy child, living in Fishamble-street, admitted into Mercer's Hospital on the 30th September, 1859, at 3 o'clock in the morning. Her grandmother stated that at 7 o'clock on the previous evening she drank a gulp of boiling water from a kettle, but had spit it out instantly. She brought her immediately to an institution in the city, and was told that it would not signify. She gave her a small dose of castor-oil, and brought her home. She slept soundly, but her breathing gradually became difficult, and continued so till her arrival at the hospital. The resident pupil gave her some ipecacuanha, but it had not any effect; and I visited her at 4 o'clock A.M., eight hours after the accident. She laboured under all the usual symptoms. She lay on her back, semi-comatose, eyes half closed, mouth open, lips scalded, respiration stridulous, inspiration long and sonorous, expirations short and quick, larynx rapidly raised and depressed, hands cold, slightly clammy. She is tossing from side to side; pupils are contracted and fixed; pulse rapid, I could not count it; epiglottis the size of a marble, and very hard.

I ordered one grain of tartar-emetic in half an ounce of water, a teaspoonful every ten minutes till vomiting was produced; three leeches over the upper bone of the sternum; the leeches were applied before the vomiting commenced. A turpentine enema was administered at the same time, and mercurial ointment was rubbed into each axilla. I waited till I saw all the above remedies employed. The emetic acted after the third dose, but nothing except water and mucus escaped, as it was some hours since she had taken food. I ordered that, as soon as her stomach was settled, she should get two grains of calomel every half hour, and that, as soon as the leeches fell off, a poultice of linseed-meal should be applied over the bites, provided none of them were bleeding too freely.

9 o'clock A.M. I was informed that the bowels had been once freely opened by the enema, and that she seemed rather

relieved by the bleeding, but had gradually relapsed into her present state. She has taken eighteen grains of calomel since my last visit; she is now in nearly the same state as before, lies with closed eyes, pupils contracted, but, when roused to swallow, the pupils dilate. At every effort to swallow she is thrown into a sort of spasm, but at other times lies half comatose; her respiration is just as difficult, and all the symptoms fully as bad as before the treatment, and her pulse is excessively rapid and weak; her cheeks are pale, and lips slightly livid. As she had not improved, and her pulse was so weak, I certainly thought she was a case which would require operation, and therefore directed a consultation with my colleagues to be called, if the symptoms should not be improved by 12 o'clock at noon. In the meantime I ordered three more leeches to be applied, and calomel, two grains every half-hour, as before. At 12 o'clock I found her sitting up in bed looking about her; breathing still hoarse, but not so sonorous as before. Her relations think her decidedly better. She has had two light-green stools, but the colour was less deep than usual. I therefore continued the calomel every hour, in one-grain doses; the improvement must have been very sudden, as the resident pupil reported that she was as bad as ever half an hour before my visit. At half-past 3 o'clock P.M. she had one stool, also free, but she lies still apparently asleep; breathing sonorous, but not so loud as before; respiration 52 in the minute; pulse 130; she has been slightly bleeding into the poultice, which I now removed; I did not think her so much improved as I expected. At 10 o'clock P. M. I received a note from Mr. O'Connor, the resident pupil (who watched the case for me with the greatest attention throughout), stating that she had three green stools of large size and deep colour; that the respirations were 48 in the minute, and pulse strong; breathing very much improved; and she had been crying for food. Calomel continued every second hour.

October 1st. The child did not sleep much during the night, but continued to breathe quietly, about 46 in the minute. No purging since last night; she seems sleepy, but not at all comatose. Dr. Jameson and myself felt the epiglottis, which is still round and hard as a marble; some saliva is constantly trickling from her mouth, sufficient to wet a small pocket-handkerchief, but her gums are neither red nor ulcerated, nor are they painful to the touch; a good deal of mucus is rattling in the larger bronchial tubes. Stop all treatment.

2nd. Pulse 120; respiration easy; no sonorous inspiration;

slight catarrh; some mucus still in the bronchi; wishes for food; one large green stool; no ulceration or redness of the gums, but saliva still trickles from the mouth.

4th. Child dismissed, quite well, except a very slight cough.

In this case the child took fifty-six grains of calomel, forty-four in eleven hours, before the green stools made their appearance. She visited the hospital on the 8th, perfectly well.

Of the many accidents to which children are liable, one of the most painful and fatal is that produced by swallowing or attempting to swallow boiling fluids. Having seen a considerable number of such cases, and being little satisfied with the results of the treatment adopted, I have ventured on a revival, or, rather, a modification of the old in preference to what may be called the approved method, i.e. tracheotomy.

The symptoms produced by this accident are so well-known, that I will not enter on them in detail, but merely allude to them, for the purpose of dividing them into three stages. In the first stage, the mouth and fauces alone are affected, but the respiration is unimpaired. In the second, the ingress of air is impeded by laryngitis; and œdema glottidis, and incipient congestion of the lungs, are the result. In the third stage, engorgement of the lungs, and consequent congestion of the brain, are added to the previous symptoms. This division can be made in all cases; in some, no doubt, the second follows the first stage so rapidly that they might be said to be simultaneous; but, in the majority, an interval of several hours takes place between them. The child, immediately after the accident, suffers most intensely; he keeps his hand to his mouth and larynx, screams violently, and cannot swallow. After the fright and immediate pain have passed over, no bad symptom may come on for several hours; during this period he may play or sleep, or even eat fruit or cakes, given to him by his parents to stop his cries. At this time the mouth and fauces are red; white blisters are seen on the lips, cheeks, and near the root of the tongue, but he breathes without difficulty. That the symptoms are so trifling at first, should be carefully borne in mind by the surgeon. I have known several cases where children lost their lives from inattention to them in this stage; and the mistake is the more liable to occur, as frequently the symptoms are in no way more severe or different than those arising from simple scalds of the mouth, which will, of course, be rapidly cured without any treatment.

The second stage, whether it comes on rapidly or slowly, presents much more alarming symptoms. The breathing is

stridulous and croupy, rapid and much embarrassed; the features are bloated and pallid; pulse rapid; skin cold and damp; he has a tendency to doze, but can readily be roused In addition to the changes observed in the mouth during the first stage, on examination, the epiglottis will be felt by the finger to be round and hard, of the size and shape of a gooseberry or large nut, whilst sonorous and sibilant râles will be heard over the greater part of the chest. These symptoms continue for several hours, and are gradually changed into those of the third stage; in it, the respiration becomes more and more laboured and croupy; the efforts to inspire are more painful; the larynx is drawn up and down rapidly, and deep fossæ are formed above the clavicles during the convulsive efforts to fill the chest. The little patient lies with his head thrown back; his eyes fixed, half open, and turned up under the lids; the pupils are fixed and dilated; his face is swollen and purplish; his mouth half open; he tosses his arms about; and, although semi-comatose, vainly seeks to relieve the sense of impending suffocation from which he is suffering. During this stage, the mucus is heard rattling up and down in the lungs and bronchial tubes; coma gradually increases, until he either dies in that state, or is carried off in a paroxysm of convulsion.

The treatment recommended and adopted by the most distinguished surgeons and physicians of the present day may be summed up in a few words: at first, antiphlogistics; and then, the operation of tracheotomy; the only difference of opinion being as to the time at which the operation should be performed. Some prefer to operate in the early stage: Dr. Copeland, in his excellent Dictionary, says: "An early recourse to the operation is particularly indicated, when laryngitis has been caused by swallowing acrid, corrosive, or boiling fluids, as the means of cure recommended do not act so rapidly, and an early opening into the trachea facilitates the treatment of the injured parts." Dr. Watson also advocates the early recourse to operation; he seems very sanguine of its success, but his experience seems to have been derived rather from tracheotomy for laryngitis in the adult than in that of the infant. He says: "If an artificial opening be made while the patient's strength is still entire, and before his system is poisoned by the venous blood, or his lungs are overwhelmed with sanguine congestion and serous effusion, it will almost infallibly save his life." He therefore says that "it is a bad and foolish practice to wait."

Others defer the operation: thus Mr. Porter says: "When we have such abundant evidence of the occasional success of antiphlogistic measures, I think they should be adopted and

persevered in until the breathing becomes so affected that there is every reasonable probability of the operation becoming necessary. At this crisis it should not only be proposed, but its advantages impressed upon the patient's friends. Although a person might now and then be subjected to it without absolute necessity, yet I feel convinced that numbers would be preserved." Also Dr. Jameson[a] (who published thirteen most interesting cases of tracheotomy) says: "Should the usual remedies, such as emetics, leeches, heat to the surface, fail to allay the urgent symptoms; but when the breathing becomes stridulous and croupy, or amounting to a mere pant from spasm of the glottis, the pulse quick and small, the temperature of the body diminished, the head drawn back, face congested, eyes half open, inclination to coma and difficult deglutition, I should, on the first accession of these symptoms, at once be inclined to operate." So also Erichsen says[b]: "If urgent symptoms of dyspnœa have set in, tracheotomy must be performed without delay." That the operation is by no means a successful one, is acknowledged even by those who recommend it. Erichsen says, "that in the majority of the cases that have fallen under his observation, in which this operation has been performed, the issue has been a fatal one from the speedy supervention of broncho-pneumonia." No doubt, a few successful cases are to be found in the periodicals, but these are of little assistance in our endeavour to arrive at the value of the operation, as the many unsuccessful ones are never reported. Dr. Jameson recorded three cures out of eleven operated on; and, from my own experience, I would consider this a fair average. The want of success has been attributed by some surgeons to the hemorrhage during the operation; but this does not accord with my experience, as in only two of the cases recorded by Dr. Jameson was there any hemorrhage; and in none of the fatal operations I have seen was there bleeding to any extent. Other surgeons attribute the deaths to the delay of the operation; but in several cases I have seen the operation performed eight hours after the accident, and still the result was death. It is far more probable that the broncho-pneumonia and infiltration of the lungs are the real causes of the fatality. As in drowning, or other cases of asphyxia, this takes place sometimes in a very short time after the accident, and will not be improved by the operation; indeed, it is a question of much difficulty to decide whether the admission of cold air, directly into the trachea and bronchial tubes, may not accelerate the

[a] Dublin Quarterly Journal of Medical Science, No. IX. [b] Surgery, page 311.

congestion and inflammation of lungs already diseased; for this reason it is that, although, as soon a free opening is made into the trachea, the patient always appears much improved, so much, indeed, as frequently to mislead both the surgeon and the patient's friends; still, after a few hours, all the symptoms recur, and increase till he dies, just as if the operation had never been performed. In fact, the asphyxia is cured, but the infiltration and congestion of the lungs continue, and kill the patient.

The cases I now publish were fully so bad so to justify the operation; the stridulous breathing; bloated, pale features; fixed pupils; rapid, feeble pulse; congested lungs; cold surface; hard, erect epiglottis; and incipient coma, were certainly as bad as in many cases where I have both operated myself and seen the operation performed by other surgeons without success. I therefore have a right to conclude that, had the operation been performed, not more than one out of the four cases would have survived.

If a patient is *in extremis*, then, no doubt, the surgeon is justified in trying the operation, as, although nearly hopeless, it is the only treatment which can save the patient from immediate dissolution; and that occasionally such a case may recover, is proved by a few instances reported in the periodicals and in books. Still I believe that the antiphlogistic treatment, if conducted with sufficient rapidity, will be far more successful; but, to be successful, it must be rapid and energetic in the extreme; a few hours are all we have for treatment, unless we can suddenly stop, or at least delay the progress of the second stage; the injury to the lungs and brain will be such as to preclude the possibility of success.

I commence the treatment with an emetic, followed by a cathartic enema, at the same time a few leeches, according to the strength of the child, are applied over the upper margin of the sternum, the bleeding being encouraged by a warm fomentation or poultice. Should the child sleep, I leave directions that I shall have notice of his having awakened, or visit again in a few hours. Should symptoms of the second stage appear, I commence calomel in doses according to the age and strength of the child and the severity of the symptoms. The leeches should be repeated every third or fourth hour, if the strength of the child permits it, great care being taken to avoid hemorrhage from the bites, or exhaustion from loss of blood; for this reason it is indispensably necessary that either the surgeon or a competent assistant should visit before each repetition of the leeches. The calomel should be repeated at very

short intervals, every hour or half-hour, and the body should be rubbed with mercurial ointment, or a portion of the ointment be placed in each axilla, the object being to produce the specific effect of the mineral in the shortest possible time

The effect of this line of treatment has been most satisfactory. The leeching gave relief for the moment, and, although its effects were transitory, yet it gave time for the action of the mercury, in all probability promoted its absorption, and at the same time diminished the congestion of the brain. As soon as the mercury produced the green stools, the symptoms in every case were improved, and the child recovered. The lungs were the first organs relieved, the brain next, and the larynx last of all; indeed, for several days, after all other bad symptoms had disappeared, the epiglottis remained swollen and hard. Should the case have arrived at the second stage, the orthopnœa being considerable, and the congestion of the lungs rapidly coming on, I at one and the same time use the emetic, leeches, enemas, and frictions with mercurial ointment. As soon as the stomach is sufficiently settled, after the emesis, I give the calomel, in two-grain doses, and usually repeat it every half-hour, till its effects are produced, the leeches being repeated as before, every second or third hour, according to the strength of the patient. It may be said that similar treatment has been tried by others. No doubt, leeching and bleeding have been much practised. Dr. Watson seems to place his principal reliance on this and on tracheotomy; but he gives some cases himself where it did not succeed; and I have seen two where it was carried to such an extent as to produce complete exhaustion, and still the disease appeared to me to progress the more rapidly. In fact, I look upon its effects as merely transitory, and of importance in saving the brain and lungs from impending congestion until the mercury has time to act. Mercury has been lauded by some, and dispraised by others. Dr. Watson does not depend on it; he says: "We cannot reckon upon its influencing the system *in time*, nor upon any marked improvement of the symptoms, when it does produce its specific effects." No doubt, if given as it generally is, two grains of calomel every third hour, the patient will die before its effects are produced; but, if given every half-hour, in one or two-grain doses, its effects will be produced in an extremely short time, especially if assisted by mercurial inunction over a large extent of surface. This method of rapidly producing the effects of mercury on the system has been taught us by cases of injury of the head, where in a few hours we have salivated adults by small and rapidly repeated doses of the metal; in the present

cases the green stools were produced in one so early as eight hours after the first administration of the mercury, and, in the other cases, in periods varying from eighteen to twenty-six hours. I do not deny that patients may die, even after the action of the mercury on the system, but I have never seen an instance of it except one where I had previously performed tracheotomy, from which circumstance I now doubt whether he would not have recovered had the operation been omitted. It may be said that four cases are not sufficient to establish any line of practice. My answer is, that they are the only cases I have had since I made use of this mode of treatment, and as they were all successful, I think I am justified in publishing them, in hopes they may lead others to follow the same course, and publish the results. It might be thought that the administration of such large doses of calomel in so short a time would be objectionable, but, except in one case, where an increased flow of saliva for a couple of days, and, in another, where a slight diarrhœa succeeded, no bad effects whatever resulted, and the children appeared to enjoy perfect health after a few days.

Since the above was written, a valuable statistical report has appeared in the Number of the Medical Times and Gazette for October 22, 1859. From it we learn that the operation of tracheotomy for scalds of the larynx has been even more fatal in England than in Ireland, since only three cases recovered of fourteen operated on; and, as in one of these it seemed to the author doubtful whether the glottis was scalded at all, this would leave the proportion of recovery only one in six and a half. This report confirms many of my statements: First, that the fatality of the operation did not arise from delay, as in most of them the operation was performed in less than seven hours, and in one so early as one hour and a half after the accident. Secondly, that most of the cases seemed to be improved by the operation for a short time, although they afterwards died. Thirdly, that, in several at least, disease of the lungs, either bronchitis, pneumonia, or broncho-pneumonia, was the immediate cause of death. Unfortunately, the pathology of several cases is very imperfectly detailed; in only one case hemorrhage, and in three, exhaustion, was the cause of death.